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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/031,081

01/16/2002

Osamu Terasaki

TAKIT 162

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7590

10/24/2002

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EXAMINER

SOUW, BERNARD E

ART UNIT

PAPER NUMBER

2881

DATE MAILED: 10/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/031,081

Applicant(s)

TERASAKI ET AL.

Examiner

Bernard E Souw

Art Unit

2881

-- **Th MAILING DATE** of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 January 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Priority*

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 05/17/2000. It is noted, however, that applicant has not filed a certified copy of the Japanese application as required by 35 U.S.C. 119(b).

### *Information Disclosure Statement*

1. The references cited in the PCT Application PCT/JP00/08326 have been considered, but will not be listed on any patent resulting from this application because they were not provided on a separate list in compliance with 37 CFR 1.98(a)(1). In order to have the references printed on such resulting patent, a separate listing, preferably on a PTO-1449 form, must be filed within the set period for reply to this Office action.

### *Drawings*

2. The subject matter of this application admits of illustration by a drawing to facilitate understanding of the invention. Applicant is required to furnish a drawing under 37 CFR 1.81. No new matter may be introduced in the required drawing.

Applicant is given a **THREE MONTH** time period to submit a drawing in compliance with 37 CFR 1.81. Extensions of time may be obtained under the

provisions of 37 CFR 1.136(a). Failure to timely submit a drawing will result in **ABANDONMENT** of the application.

### ***Specification***

3. The disclosure is objected to because of the following informalities:

- The pages are not numbered.
- On pg.2, line 25, "*but uniquely determination of ...*" is grammatically incorrect.
- Still on pg.2, lines 25-26, in contradiction to Applicant's disclosure, methods of determining the phase of the structure factor is well known in the art, such as the "Direct Method" cited below.
- On pg.3, line 20, the section title "***Problem that the Invention is to solve***" is objected to, because the disclosure that follows this title does not describe a problem, but a specific solution proposed by Applicant.
- On pg.8, line 7, "*data in **the** TEXT file or **the** program ...*", is incomprehensible because neither the "*TEXT*" nor "*program*" have been earlier recited. Should the "*TEXT*" be understood as being a common name that would justify the use of the definite article "*the*", then it must be so uncommon such that it is not known in the pertinent art, except the Applicant, which means as good as unknown.
- On pg.8, line 10, "***the** space group*" is objected to for the same reason as above.
- On pg.8, lines 11-12, "*... is stored as **a** TEXT file*", now the Applicant is using the indefinite article "**a**", which is really confusing as to which TEXT file is really meant.

On pg.8, line 17, in the expression “**Accordingly**, each set ....”, it is not clear, according to what, is meant by the Applicant.

- On pg.8/lines19-20, “**conferring** phases on **the latter** on the basis of the phases of **the former**” is incomprehensible; the word “*conferring*” does not explain any operation, and the words “**the latter**” and “**the former**” do not clearly identify, what are being meant, because there are no precedents for “*the former*”, as well as for “*the latter*”, which would justify the use of the definite article “*the*”.

- On pg.10, lines 24-26, the sentence is grammatically in error, so it cannot be discerned what is the subject, what is the verb, and what is the object. In short, the sentence is totally incomprehensible.

- The specification is generally narrative and indefinite, failing to conform to current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors, of which only a few have been identified above.

Appropriate correction is required.

- The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

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art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The disclosure fails to describe how to evaluate the phase from the TEXT file. Firstly, the disclosure fails to describe what the TEXT file is, in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Secondly, even if the word "TEXT file" would have been ignored for being not important, for example if it were representing any data file created in the computer memory, the disclosure still fails to describe how to evaluate the phase from the data.

In particular, the only description provided by Applicant as to how to evaluate the phase from the TEM image (or diffraction pattern) is not enabling. On pg.5 it is recited *"the phases of diffracted waves are read on the assumption of weak topological object approximation"*, where *no diffracted waves* has been recited before. Even if a diffracted wave is now assumed (in contradiction to the previous recitations), the above recitation does not teach one of ordinary skill in the art, how to *read* the phase from the diffraction image.

This § 112 rejection is made, not because a method for phase evaluation is unknown or unavailable, sofar. In the contrary, such methods are abundant and also quite well known in the art, e.g. the *"Direct Method"* described in "Feasible Set Direct

Methods Code”, downloaded from <http://www.numis.nwu.edu/fs98>, or described in USPAT 5,365,456 in Col.2/ll.14-31, and further, as described in the “*Convergent Beam Electron Diffraction (CBED)*” described by L.A. Bendersky & F.W. Gayle in J. Res. Natl. Inst. Stand. Technol. **106**, 2001, pp.997-1012).

This § 112 rejection is made, solely because Applicant has declared that determining the phase is unmakeable on pg.2/lines 25-26, at least in the Applicant’s special case of soft material. However, the novelty of Applicant’s invention, which is claimed to be especially applicable to soft materials, is not adequately disclosed so as to enable one skilled in the art to make and/or use the invention.

Applicant is cautioned, not to introduce New Matter in obviating this rejection.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the step of “*evaluating therefrom amplitudes and phases of three dimensional crystal structure factors, and further performing inverse Fourier transforms by use of the values evaluated*”, is not comprehensible, firstly because the claim itself does not describe how the evaluation is performed, and secondly, because the specification does not provide a standard for *evaluating the amplitudes and phases from*

*the data*, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

6. Claim 1 is further rejected under 35 U.S.C. 112, second paragraph, because it is not clear what kind of data is used by Applicant, a Fourier transform of a transmission electron microscopic (TEM) image, as recited on pgs.5-6 of the disclosure, or a Fourier transform of an electron diffraction pattern, as recited on pg.7. In this respect, the terminology "*Fourier diffraction pattern*" used by Applicant on pg.5 lines 23-24, and pg.7/lines13, 15 and 16, does not conform with the accepted meaning of the word "*diffraction pattern*".

As generally known in the art, an electron diffraction pattern is formed on the back focal plane (BFP), which is also called the reciprocal plane. On the other hand, a TEM image is formed on the usual image plane of the microscope. Although the two patterns are mathematically connected by Fourier transform, they physically represent two separate and distinctively different features, and should never be confused one with the other.

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.



Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Dorset (Trends in Polymer Sciences Vo.4, No.7, July 1996, pp. 212-216).

Dorset discloses a method of determining a soft material structure (Dorset's polymer is a soft material per Applicant's definition of the terminology) by taking TEM images of the soft material under a plurality of crystallographically significant directions, as recited on pg.213/Col.1/ll.21-24.

Dorset's method sets forth with the step of Fourier transforming each of the images photographed and evaluating therefrom amplitudes and phases of the three-dimensional crystal structure factors, as recited on pg.212/Co.2/ll.31-38 and pg.213/Col.1/ll.15-1 from bottom.

Dorset's method is accomplished by a further step of performing inverse Fourier transforms by use of the values evaluated, as recited on pg.212/Col.2/ll.20-12 from bottom and on pg.214/Col.1/ll.11-14.

- Regarding claim 2, Dorset's method includes the step of taking the TEM image of more than at least three different directions, although three images is the minimum number in order to derive the 3-dimensional space group of the soft material sample, as generally known in the art.

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dorset in view of Anderson (US 2002/0102674 A1).

Dorset shows all the limitations of claim 3, as previously applied to claim 1, except the recitation of specific forms of soft materials, which is rendered obvious by Anderson.

Anderson's soft material is a porous material, as expressly recited as such in the Abstract/lines 1-5. Furthermore, Dorset's polymer belongs to light materials due to the hydrogen and carbon forming its major constituents, as generally known in the art.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Dorset's electron crystallography method for determining the crystallographic structure of Anderson's soft/porous materials, thereby extending the classification of soft materials to include Anderson's porous materials such as biological membranes, since these molecules, too, are made of light atoms and have a periodicity of a substantial multiple of atomic sizes, i.e., in the range of 20-500 Å, in agreement with Applicant's private definition of the terminology, as generally known in the art.

9. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dorset's as modified by Anderson's, as applied to claims 1 and 3 above, and further in view of Subbiah (US 2002/0102674 A1, hereafter addressed by Subbiah-456).

Dorset's as modified by Anderson's shows all the limitations of claims 4-6, as previously applied to claim 1, except the recitation of a particular selection of specific materials as soft material, which is here rendered obvious by Subbiah-456.

- Regarding claims 4 and 5, Subbiah-456's soft material matches Applicant's definition of the terminology. Subbiah's material is made of macromolecules, as recited in Col.1/ll.23-27 and Col.2/ll.33-39. In addition, Anderson's soft materials also include membrane polymers, as recited on pg.10/Col.2/section [0110].
- Regarding claim 6, Subbiah's macromolecules have periodicities up to 45 Å, as recited in Col.21/ll.15-20.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to extend the classification of soft materials according to Dorset as modified by Anderson, to include macromolecules and biological membranes, as specified by Subbiah, since these molecules, too, are made of light atoms and have a periodicity of a substantial multiple of atomic sizes, i.e., in the range of 20-500 Å, as generally known in the art.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard E Souw whose telephone number is 703 305 0149. The examiner can normally be reached on Monday thru Friday, 9:00 am to 5:00 pm..


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on 703 308 4116. The fax phone numbers for

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the organization where this application or proceeding is assigned are 703 872 9318 for regular communications and 703 872 9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

bes  
October 1, 2002



**JOHN R. LEE**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**